Classification of

Programming Languages

Assignment

(Core Concept)

Submitted By : Gourab Sinha

**1.** What are the key components of a microprocessor? Explain their roles in the execution of instructions?

**Ans** - Key components of a microprocessor include the ALU (Arithmetic Logic Unit) for calculations, CU (Control Unit) for instruction interpretation, registers for temporary data storage, and the memory unit. The ALU performs arithmetic operations, the CU manages instruction flow, registers store data temporarily, and memory stores both data and instructions.

**2**. Differentiate between Machine Level Language (MLL), Assembly Language (ALL), and High-Level Language (HLL) in terms of their coding structures and levels of abstraction?

**Ans** - Machine Level Language (MLL) is binary code, Assembly Language (ALL) uses mnemonics, and High-Level Language (HLL) uses human-readable syntax. MLL is low-level and machine-specific, ALL provides symbolic representation for instructions, and HLL offers greater abstraction, making code more readable and portable.

**3.** Explain the functions of an assembler, a compiler, and an interpreter, and provide examples of scenarios where each would be preferred in the software development process?

**Ans** - An assembler translates assembly code to machine code. A compiler translates high-level code to machine code before execution. An interpreter translates and executes high-level code line by line. Assemblers are suitable for low-level programming, compilers optimise code for execution speed, and interpreters allow for easy debugging in high-level languages.

**4.** Discuss the imperative, functional, and object-oriented programming paradigms, outlining their key characteristics and providing examples of programming languages that represent each paradigm?

**Ans** - Imperative programming focuses on giving instructions, functional programming emphasises mathematical functions without changing state, and object-oriented programming organises code around objects with attributes and methods. Examples include C for imperative, Haskell for functional, and Java for object-oriented programming.

**5.** Trace the history of three popular high-level programming languages, highlighting their creators, release dates, and their contributions to the field of computer programming?

**Ans** - Python, created by Guido van Rossum in 1991, emphasises readability. Java, developed by James Gosling and others in 1995, is known for platform independence. JavaScript, by Brendan Eich in 1995, is crucial for web development.

**6**. Identify and explain five essential features of the Java programming language that contribute to its widespread usage and popularity in software development?

**Ans** - Java's portability across platforms, object-oriented structure, strong type system, automatic memory management, and extensive standard library contribute to its popularity in software development.

**7.** Provide an overview of the major versions of the Java programming language, highlighting the key improvements and features introduced in each version, up until the most recent release?

**Ans** - Major Java versions include JDK 1.0 (1996), introducing applets; JDK 5 (2004), with generics and metadata annotations; JDK 8 (2014), introducing lambda expressions; JDK 11 (2018), with long-term support and modularization; and the latest, JDK 17 (2021), featuring pattern matching and new APIs.